Deutsche Umwelthilfe

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Federal Motor Transport Authority
President Präsidenten Ekhard Zinke
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Berlin, 1 February 2016

Application for withdrawal of type approval – alternative recall order for the Mercedes C 220 CDi BlueTec

Dear President Zinke,

The DUH is an environmental association that is recognised in accordance with the Environmental Appeals Act and thus entitled to bring proceedings. According to the judgment of the Federal Administrative Court of 5 September 2013 regarding the Clean Air Programme of Darmstadt, it can proceed against any violation of the environmental law involving the protection of third parties. According to the internationally binding instructions of the Aarhus Compliance Committee, this applies even beyond the regulations governing third-party protection.

The DUH hereby applies for

the withdrawal of the type approval of the vehicle investigated in TNO report 2015 / R10702 (Mercedes-Benz C220 CDi BlueTec) or, alternatively, to order a call-back arrangement vis-à-vis Daimler for the vehicles already delivered that ensures immediate compliance with the applicable emission limit values for nitrogen oxide.

The deadline for deciding on our application has been set as follows: **1 March 2016.**

Rationale:

The Dutch Environment Ministry charged the TNO testing institute with the implementation of "Detailed investigations and real-world emissions performance of Euro 6 diesel passenger cars" (for the report see Appendix 1). A total of 16 vehicles were investigated and compared with respect to their emission behaviour in the laboratory or on the road. The published results were, however, made anonymous by giving each vehicle a letter/number code. Since 20 January 2016, it has been known with certainty, thanks to the broadcasting of official information issued on the part of the Dutch government by Dutch television (Appendix 2), that the vehicle tested (vehicle "M1") is the Mercedes C 220 CDi BlueTec (Euro 6).

This model that has received type approval from the Federal Motor Transport Authority (KBA) demonstrates extremely high NOx levels with the TNO on-road measurements in particular. The measured maximum value is 2,250 mg NOx/km (28 times higher than the 80 mg/km limit).

What is frightening given the continuing exceedances of the NO2 emission limits in over 50% of the measuring stations in Germany are the shockingly high – compared to the other tested vehicles – NOx emissions of the tested Mercedes at urban speeds (TNO reference trip 'urban 0-60 km/h 'with 805 mg NOx/km or 'urban 0-45 km/h'), i.e. 817 mg NOx/km. This corresponds to a more than ten-fold exceedance of the Euro 6 NOx limit. The fact that other vehicles can roughly comply with the NOx limits under exactly the same test conditions is demonstrated by the BMW 530d also tested by TNO in these speed ranges with values of 118 or 78 mg NOx/km.

Thus the Mercedes C-Class 220 CDi clearly violates Regulation (EC) 715/2007 Art. 5 (1), which demands a functioning emission control system "in normal use" ("*The manufacturer shall equip vehicles so that the components likely to affect emissions are designed, constructed and assembled so as to enable the vehicle, in normal use, to comply with this Regulation and its Implementing measures.*").

These high on-road values are also particularly striking because the vehicle demonstrates particularly good performance under laboratory test conditions. The Mercedes displayed the best overall NOx levels on the dynamometer with (all figures mg NOx/km) 15-34 (NEDC and CADC cold/hot), 47-51 (WLTC) and 22-48 (constant speed of 80/100/130/150 km/h) – see App. A 7/8.

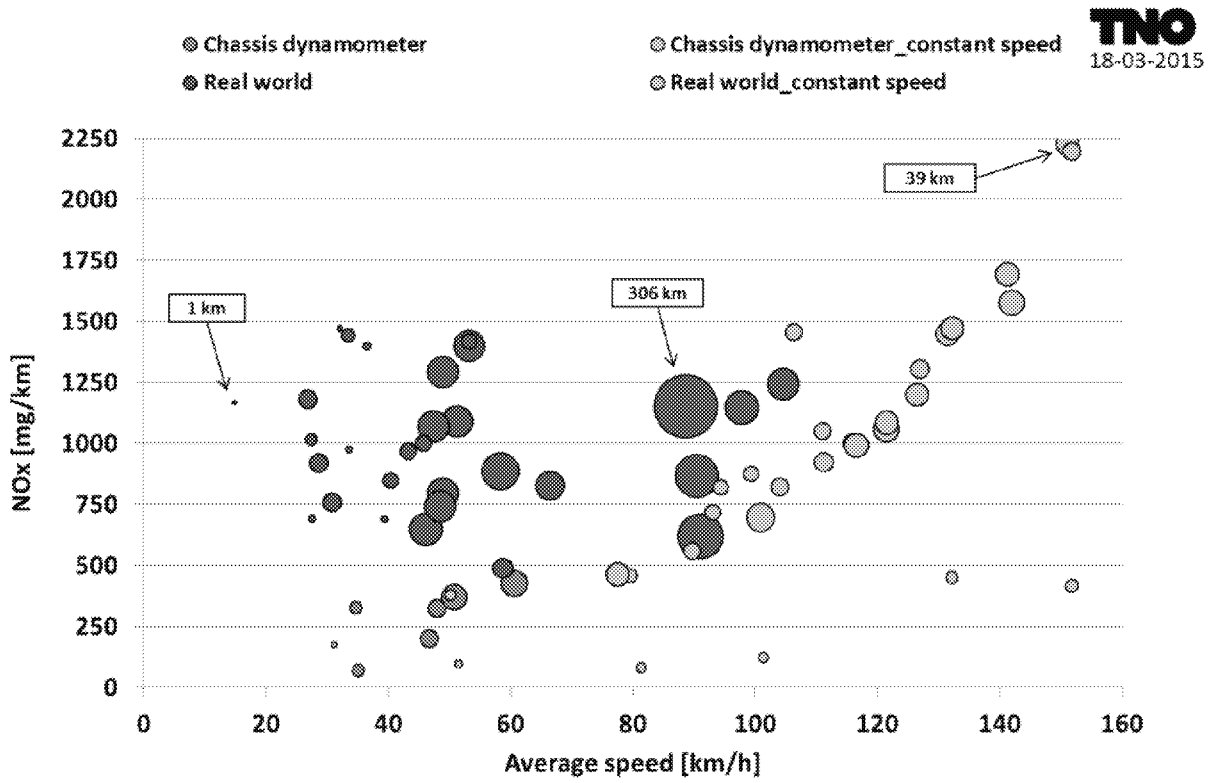
The following summary assessment regarding the tested vehicle Mercedes Benz C-Class 220 CDi appears in the report ("M1" in the TNO report):

> "*One vehicle easily satisfied the Euro 6 limit of 80 mg/km during all chassis dynamometer measurements in the laboratory, i.e. also during test cycles other than the official test protocol. In real-world driving tests on the road, however, the vehicle measured an average NOx emission of around 650 g/km. It is remarkable that the NOx emission under real-world conditions exceeds the type approval value by a factor of eight. It demonstrates that the settings of the engine, the EGR and the SCR during a real-world test trip are such that they do not result in low NOx emissions in practice. In other words: In most circumstances arising in normal situations on the road, the systems scarcely succeed in any effective reduction of NOx emissions." "It seems that a different NOx reduction strategy is used during chassis dynamometer tests compared to on road tests.*"

In several places, TNO points to the different "NOx reduction strategy", which, in the opinion of the DUH and all experts surveyed, indicates the presence of a "defeat device" according to Regulation (EC) 715/2007 Art. 5 (2), and in any event means a breach of compliance with the "in normal use" requirement as specified in Regulation (EC) 715/2007 Art. 5 (1), even when evidence of a banned defeat device has not yet been furnished.

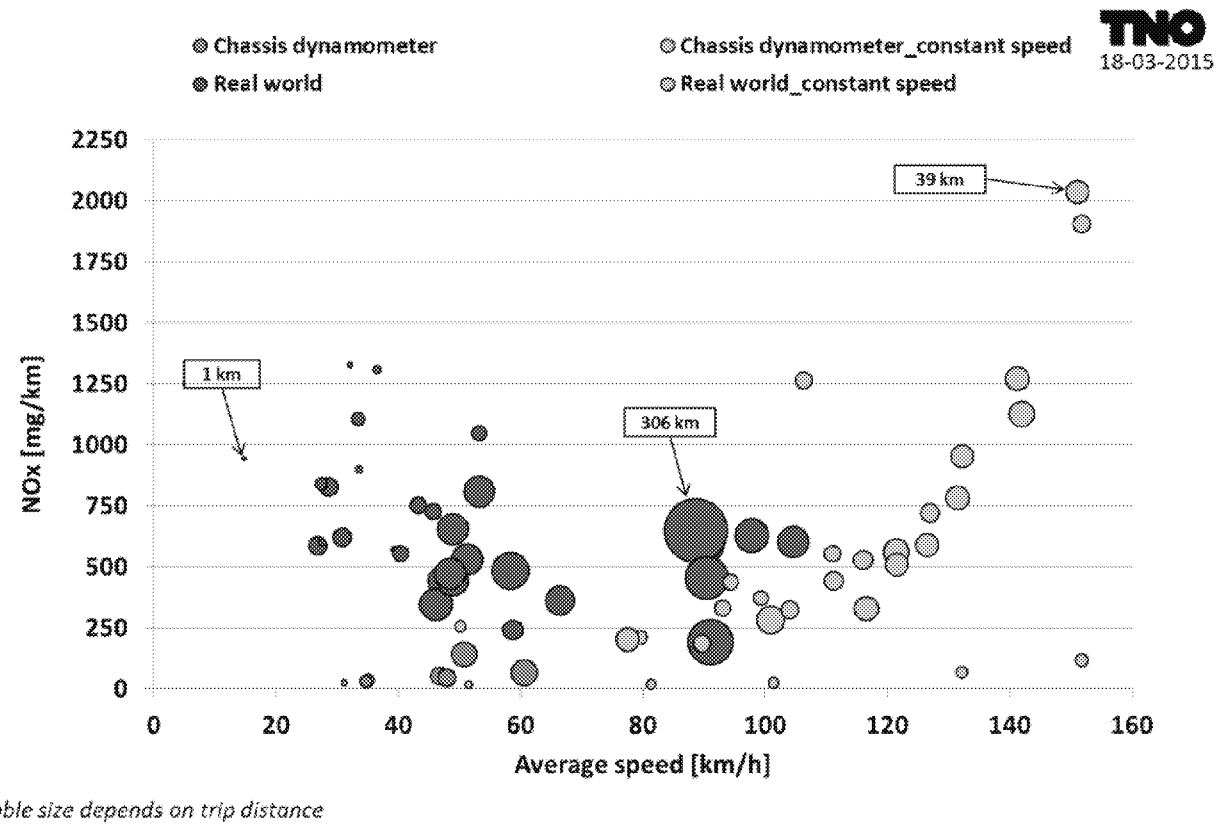
> TNO page 34: "*In chassis dynamometer tests the engine-out NOx emissions are 100 to 450 mg/km, indicating an effective EGR system which reduces NOx emissions in certain chassis dynamometer tests. In real-world tests the EGR system seems to be less effective or not effective at all, as engine out NOx emissions in real world tests range from 450 to as much as 2250 mg/km. For dynamic road trips the tailpipe NOx emissions are approximately 250 to 750 mg/km and for most constant speeds it ranges from 250 to 2000 mg/km (Figure 22). However all chassis dynamometer test results are below or near the type approval limit*

value of 80 mg/km. This seems to indicate a selective use of emission control technologies, because on-road emissions are far higher than chassis dynamometer test results." The graphical representation of NOx emissions pre or post SCR (Figures 21 and 22) clearly shows the *'selective use of emission control technologies'*.



Bubble size depends on trip distance

Figure 21: Pre-SCR NOx emissions of vehicle M1 of on-road trips and chassis dynamometer tests.



Bubble size depends on trip distance

Figure 22: Post-SCR NOx emissions of vehicle M1 of on-road trips and chassis dynamometer tests.

Source for Figures 21 and 22: TNO report | TNO 2015 R10702 | p. 34/35

This is especially evident in the NOx measurements at constant speed (80/100/130 and 150 km/h) on the dynamometer in particular. The measured values here range from 22 to 48 mg NOx/km. In the measurements at constant speed on the road, however, values between 250 and more than 2,000 mg NOx/km were measured, that is to say a 10 to 40-fold difference in NOx emissions between the tests carried out on the dynamometer and on the road. Another technical explanation other than that of the "different NOx reduction strategy" between the operating states on the dynamometer and the road repeatedly mentioned by the TNO is not apparent. Apart from the ambient temperature, the other test conditions were identical.

> TNO page 41: "*Vehicle M1 has an SCR conversion rate of approximately 90% with low post SCR NOx emissions on the chassis dynamometer; during on-road measurements, however, the conversion rates are between 25 and 70% with high post-SCR NOx emissions. This indicates a high engine-out NOx emission.*"
>
> *Appendix B 3/8: "Results vehicle M1: Overall the SCR conversion rate of this vehicle varies between 6 and 90%. This large variation is the result of low engine out emissions during chassis dynamometer tests and high engine out NOx emissions during on road tests. It seems that a different NOx reduction strategy is used during chassis dynamometer tests compared to on road tests. … Figure 31 and 32 show that: … During the CADC the average NH3 emissions are almost 70 mg/km, NH3 volume concentrations above 85 km/h are on average 50-100 ppm. It seems that too much AdBlue is injected at these operating conditions of the SCR-catalyst. In real world operation the engine out NOx emissions are very*

high, up to 2200 mg/km. Probably the EGR-system operates not or very poor. … These results show clearly that different control strategies of the engine are applied in chassis dynamometer tests and on the road. The high NOx reductions in chassis dynamometer tests also gain high ammonia emissions (> TNO report | TNO 2015 R10702 | 18 May 2015 Appendix B | 4/8 10 ppm). Although ammonia emission limit values are not applicable, it is common practice not to exceed an average ammonia slip of 10 ppm."

On 20 January 2016, Daimler declared in an e-mail (Appendix 3) to Dutch TV: "*To meet the requirements of the law, by low temperatures, emission-technic protection measurements were taken, which have led to higher NOx emissions in these specific test circumstances*. It is incomprehensible to us that Daimler refers to an external temperature of 7 to 10 degrees Celsius as "remarkably low" (quote from Daimler's response: "*In this case there were - for testing-purposes - remarkably low temperatures*").

In view of the fact that, during the winter months, temperatures in Germany are predominantly below 10 degrees Celsius and very high NO2 exceedances are measured during this time in particular as a result of chiefly diesel engine emissions in German and European cities, then in the view of the DUH all vehicles that do not meet even the NOx limit values for Euro 3 vehicles at urban driving speeds should be decommissioned and/or excluded in the short term from being allowed to enter environmental zones.

With its communication of 27 January 2016 (Appendix 4), the DUH asked Daimler above or below which outside temperature the engine software would kick in with "emission-technic-protection measurements" resulting in the extremely elevated NOx emissions admitted by Daimler and measured by TNO and whether, in order to control the emission behaviour, the signals emitted by the outside temperature sensors are utilised by the engine control software.

On 28 January 2016, Daimler replied in writing (Appendix 5), stating that it did not doubt the accuracy of the TNO readings or statements. A quote from Daimler's response: "*The measurement results were discussed by representatives of Daimler with the TNO and classified by the experts there as plausible. (...) The taking into account of the outside temperature and other data is crucial in order to ensure the safe protection of the components in the motor over the entire lifetime*."

This formulation corresponds to the formulation of exception a) of the prohibition on the use of a defeat device in Regulation (EC) 715/2007 Art. 5(2)a) "*the need for the device is justified in terms of protecting the engine against damage or accident and for safe operation of the vehicle."*

The striking emission behaviour of the Mercedes 220 CDi as established and documented by the TNO in conjunction with the admission of "*emission-technic-protection measurements*" and the reference to the fact that "(...) *the taking into account of the outside temperature and other data is crucial in order to ensure the safe protection of the components in the motor over the entire lifetime*" cannot be understood otherwise for the applicant than the admission of the existence of a defeat device, whose legality, however, is alleged (the reference to component protection). It is now the task of the relevant Federal Motor Transport Authority to determine whether this vehicle has a permitted or prohibited defeat device in its engine control software.

Emission control equipment in motor vehicles must operate at all "normal" temperatures. The malfunction confirmed by Daimler and the associated NOx emissions that are more than 10 times higher than the limit as measured at the TNO test temperatures (7° to 10° Celsius) represent a clear violation of the "in normal use" function rule, particularly since these temperatures predominate in Germany.

Yours sincerely

Jürgen Resch
National Director

Appendices

App. 1 - TNO Report 2015/R10702

App. 2 - Report of Dutch TV broadcaster dated 20.1.2016

App. 3 - E-mail from Daimler to TV broadcaster NOS dated 20.1.2016 and NOS to DUH dated 21.1.2016

App. 4 - DUH letter to Daimler dated 27.1.2016

App. 5 - E-mail reply from Daimler to the DUH dated 28.1.2016